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## ARTICLE XIII.

*Notice of the Discovery of the Remains of the Ichthyosaurus in Missouri, N. A. By Richard Harlan, M.D., &c. Read October 19, 1832.*

FOR the interesting specimen which forms the subject of the present memoir, I am indebted to the politeness of our fellow member, Major N. A. Ware, who obtained it from a trader, with the information contained in the following label:—"A trader from the Rocky mountains, on his return, near the Yellow-stone knobs, or hills, observed, in a rock, the skeleton of an alligator-animal, about seventy feet in length; he broke off the point of the jaw as it projected, and gave it to me. He said that the head part appeared to be about three or four feet long."

The fossil fragments consist of anterior portions of the upper and lower jaws. The form of the intermaxillary bone, the structure of the teeth, and the mode of dentition, characterize the animal to which these bones belonged as a species of the extinct genus *ICHTHYOSAURUS*; and afford us the first indication of the existence of this genus of lost animals on the continent of America.

Future discoveries will no doubt demonstrate that our country, already rich in fossil reliquiæ, possesses numerous species of fossil Sauriens, those extraordinary inhabitants of a former state of our planet, which sported on the bosom of the ocean, or enlivened the shores of primordial worlds, ere yet the "lord of the eagle eye" had scanned the creation, or waved his magic sceptre over the beasts of the earth. Strange, indeed, are the forms, structures and habits of those beings

with which geological researches are making us acquainted: in the beautiful and sublime at least, the pre-adamitic *Fauna* and *Flora* are as yet unsurpassed by those of the present day. Cuvier remarks,—the Ichthyosaurus has the snout of a dolphin, the teeth of a crocodile, the head and sternum of a lizard, the extremities of a whale, and the vertebræ of a fish; whilst the Plesiosaurus has, with the same cetaceous extremities, the head of a lizard, and a neck resembling the body of a serpent.

The remains of four or five species of the Ichthyosaurus have hitherto been discovered in England, France, and Germany. In England their remains have been found from the new red-sandstone even up to the green sand, which is immediately subjacent to the chalk. They consequently belonged to almost all that epoch of secondary formations, commonly known by the name of Jura formation; but it is to the blue-gray limestone, called *lias* by the British geologists, that we are to look for the greatest abundance of these organic remains. In the fragment from Missouri, consisting of the snout, or anterior portion of the upper jaw, the intermaxillary bone is strongly marked by sutures which separate it from portions of the maxillary bones, beyond which it extends nearly two inches anteriorly. The nostrils in this genus being placed near the eyes, the intermaxillary is consequently without perforations for nostrils, and displays a remarkably dense structure; its greatest breadth is two inches. It is perforated by several rather large foramina for the transmission of blood-vessels, and contains four incisor teeth, two on each side, broken off on a level with their sockets. The portions of maxillary bones attached, contain three teeth on each side, all equally broken off at the socket; thus making in all ten teeth in a space of alveolar processes four inches long—the total length of the fragment. The alveoles are perfectly distinct, and consist of circular osseous elevations, in the cavities of which the teeth are firmly fixed. The enamel is thick, brittle, and of a jet black colour; the cavities of the teeth are for the most part filled with spath and quartz. The truncated surface of the posterior portion of the fragment displays the mode of dentition, where the young tooth, also hollow, is observed to project its point on the inner side of the root of the old tooth; the root of which it destroys

by pressure during growth, and which falling, allows the young tooth to take its place, the point of the young tooth always cutting the gum on the inner and posterior part of the old tooth. On the inner and posterior part of the anterior left incisor, is observed the conical point of a young tooth, projecting in such a manner as to render a new socket necessary for its future accommodation.

All the natural vacuities of these bones are filled with the matrix or rock in which they occurred, which consists of a dense blue-black argillaceous limestone, effervescing with weak acids, and not unlike the matrix containing the bones of the Ichthyosauri from the lias of England. Beautiful and rich specimens of these fossils are contained in the cabinet of Mr G. W. Featherstonhaugh of this city. This fragment of jaw is four inches long, two inches eight tenths broad, and two inches in depth at its truncated part. It remains to notice the fragment of lower jaw of the left side, of equal length with the upper portions, and one inch two tenths in thickness, containing the remains of five teeth, broken, and partially covered with the matrix. The exterior surface of the bone is finely scabrous, or marked by the attachments of the skin, and displays numerous foramina for the transmission of nerves and blood-vessels. Near the base of the inner surface is a deep longitudinal canal, which probably extended the whole length of the jaw. From an experiment made by placing a portion of these fossils in a dilute solution of muriatic acid, the whole mass would appear to be soluble; thus denoting the loss of the animal constituent of the bones.

The above considerations enable us to pronounce with certainty on a fact, in itself interesting to the geologist, viz. the existence of the remains of the genus Ichthyosaurus in the secondary deposits on the banks of the Missouri river. In the present stage of the investigation it is probably premature to pronounce with equal certainty on specific distinctions; yet the magnitude of this skeleton, being thrice the size of the largest of the species yet described, and the geographical position of the fossil, seem to indicate such distinction. On comparison of the teeth of the present species with those of a fine specimen of the head of the largest species, the *I. communis*, in Mr Featherstonhaugh's collection, peculiarities were observable. It is highly probable that future discovery will throw more light on this interesting subject, as the

present skeleton would appear to be not the only one exposed to view in the valley of the Missouri; and, judging from the zeal, ardour, and scientific acumen with which such researches are prosecuted at the present day in all quarters, we may hope that the era of their resuscitation is not remote. To the Mosasaurus, Geosaurus, Saurocephalus, and fossil crocodiles, the Ichthyosaurus and typifications at least of the Plesiosaurus may now be added to this department of the fossil Fauna of North America.

It is not improbable that Lewis and Clarke, in their Expedition up the Missouri, allude to the remains of a similar animal in the following extracts. "Monday, September 10th, 1804, we reached an island (not far from the grand detour, between Shannon creek and Poncarrar river), extending for two miles in the middle of the river, covered with red cedar, from which it takes the name of *Cedar Island*; just below this island, on a hill, to the south, is *the back-bone of a fish forty-five feet long, tapering towards the tail, and in a perfect state of petrification*, fragments of which were collected and sent to Washington. On both sides of the river, are high, dark-coloured cliffs."—Vide Lewis and Clarke's Exp. ed. 1814, vol. i. p. 69. Again, on descending the Yellow-stone river:—"The north side of the river, for some distance, is diversified by jutting romantic cliffs, these are succeeded by rugged hills, beyond which the plains are again open and extensive. After enjoying the prospect from this rock, to which captain Clarke gave the name of *Pompey's Pillar*, he descended and continued his course; at the distance of six or seven miles he stopped, and while on shore, he saw in the face of the cliff on the left, about twenty feet above the water, a *fragment of the rib of a fish, three feet long, and nearly three inches in circumference, incrustated in the rock itself*."—Ibid. vol. ii. p. 358.

It has already been stated, that the fossils which we have described were obtained near the junction of the Yellow-stone and Missouri rivers. Should the fossils noticed in the above extracts, prove to be of a similar nature, the fact will display a formation extending from three to five hundred miles in a direction east and west, and north and south. Until further informed, it will be useful to apply to this species some specific appellation, and we propose to designate it as the **ICHTHYOSAURUS MISSOURIENSIS**.

## NOTE.

SINCE writing the foregoing essay, the author has enjoyed a more extensive field of observation, in the examination of the numerous and magnificent collections in every department of natural science, both in Great Britain and in France. He has satisfied himself that the Missouri fossil (*I. Missouriensis*) must be arranged as an extinct genus altogether new, characterised, more particularly, in the fragment in question, by the extreme length, breadth and projection of the intermaxillary bone, in which it presents a marked difference from any species of the genus *Ichthyosaurus*, and approaches, in a slight degree, animals of the Batrachian order.

## EXPLANATION OF THE PLATE.

Fig. 1. Abdominal view of the vertebra of the *Basilosaurus*.

Fig. 2. Articulating surface of the body of the same.

Fig. 3. View of the superior surface of the anterior extremity of the snout of the *Ichthyosaurus Missouriensis*.

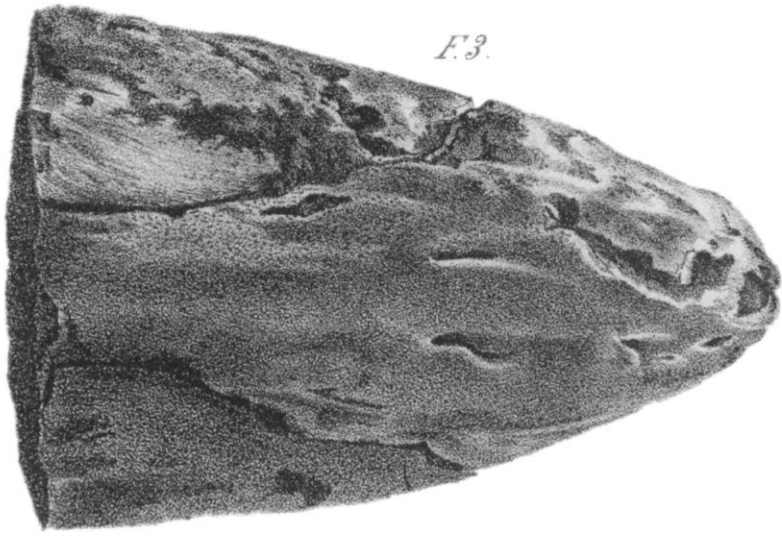
Fig. 4. The fractured surface of the same.

Fig. 5. Palatine surface of the same.

Fig. 6. Lateral view of the same, external surface.

Fig. 7. Internal lateral view of the anterior extremity of the inferior maxilla.

Fig. 8. Fractured extremity of the same.



*F3.*



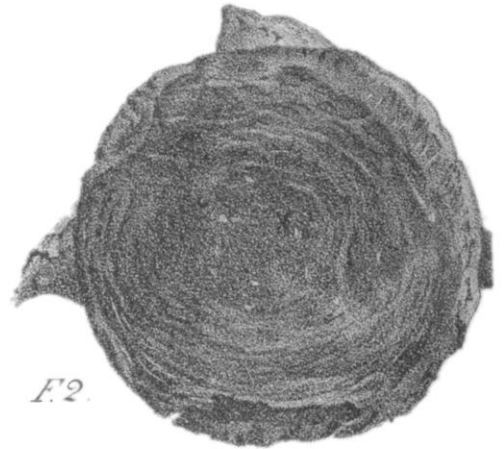
*F4.*



*F7.*



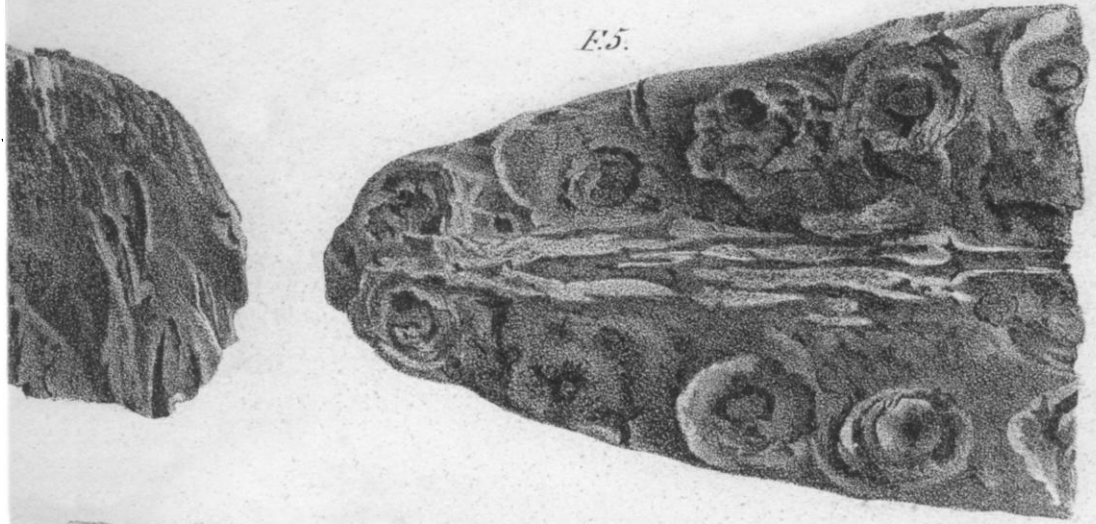
*F8.*



*F2.*



*F.5.*



*F.6.*



*F.7.*

